CLAIMS

What is claimed is:

1. A method for detecting data in a code division multiple access (CDMA) wireless communication system, the method comprising:

receiving a plurality of communication signals;

modeling a solution for estimating data of the received communication signals using a linear system requiring a matrix inversion;

determining columns or rows of an approximate Cholesky factor;

determining a difference between the determined columns or rows;

if the determined difference is less than a threshold, determining subsequent columns or rows by repeating previously determined columns or rows;

estimating the data of the received communication signals using the approximate Cholesky factor; and

using the data estimate to detect data received on a plurality of received communications channels.

2. The method of claim 1 further comprising using the approximate Cholesky factor is used to determine the spread data of the received communications in a user detection process comprising one of SUD or MUD, using one of ZF or MMSE data detection approaches.

3. The method of claim 1 further comprising repeating previously determined columns or rows, if a number of previously determined columns or rows

exceeds an upper limit.

4. The method of claim 1 wherein the linear system is modeled using a minimum mean square error approach.

5. The method of claim 1 wherein the linear system is modeled using a zero forcing approach.

6. The method of claim 1 wherein the approximate Cholesky factor is lower triangular.

7. The method of claim 1 wherein the approximate Cholesky factor comprises a plurality of K by K blocks and K is a number of the received signals.

8. The method of claim 6 wherein the approximate Cholesky factor is determined by columns.

9. The method of claim 7 comprising using block columns of a multiple equal to one or more L blocks in length where L is the longest length of intersymbol interference.

10. The method of claim 1 comprising determining an error between normalized blocks of the columns or rows.

11. The method of claim 1 comprising comparing a first determined block of a newly determined column or row to a corresponding block of a previously determined column or row, prior to determining subsequent blocks of the newly determined column or row.

12. A user equipment comprising:

an antenna for receiving a plurality of communication signals transmitted in a CDMA format;

a data estimation device for estimating data of the received communication signals using a linear system requiring a matrix inversion; for determining columns or rows of an approximate Cholesky factor; for determining a difference between the determined columns or rows; if the determined difference is less than a threshold, for determining subsequent columns or rows by repeating previously determined columns or rows; for estimating the data of the received communication signals using the approximate Cholesky factor; and using the estimate to detect data received on a plurality of received communications channels.

13. The user equipment of claim 12 wherein the data estimation device uses the approximate Cholesky factor to determine the spread data of the received communications in a user detection process comprising one of SUD or MUD, using one of ZF or MMSE data detection approaches.

14. The user equipment of claim 12 wherein:

the data estimation device further includes a circuit function for repeating previously determined columns or rows, if a number of previously determined columns or rows exceeds an upper limit.

15. The user equipment of claim 12 wherein:

the data estimation device further includes a circuit function for repeating previously determined columns or rows, if a number of previously determined columns or rows exceeds an upper limit; and

the data estimation device compares a first determined block of a newly determined column or row to a corresponding block of a previously determined column or row, prior to determining subsequent blocks of the newly determined column or row.

16. The user equipment of claim 12 wherein the approximate Cholesky factor is lower triangular.

17. The user equipment of claim 12 wherein:

the approximate Cholesky factor comprises a plurality of K by K blocks and K is a number of the received signals;

the approximate Cholesky factor is determined by columns; and

the block columns comprise a multiple equal to one or more L blocks in length

and L is the longest length of intersymbol interference.

18. A base station comprising:

an antenna for receiving a plurality of communication signals;

a data estimation device for estimating data of the received communication signals using a linear system requiring a matrix inversion; for determining columns or rows of an approximate Cholesky factor; for determining a difference between the determined columns or rows; if the determined difference is less than a threshold, for determining subsequent columns or rows by repeating previously determined columns or rows; for estimating the data of the received communication signals using the approximate Cholesky factor; and using the estimate to detect data received on a plurality of received communications channels.

19. The base station of claim 18 wherein the data estimation device uses the approximate Cholesky factor to determine the spread data of the received communications in a user detection process comprising one of SUD or MUD, using one of ZF or MMSE data detection approaches.

20. The base station of claim 18 wherein:

the data estimation device further includes a circuit function for repeating previously determined columns or rows, if a number of previously determined columns or rows exceeds an upper limit.

21. The base station of claim 18 wherein:

the data estimation device further includes a circuit function for repeating previously determined columns or rows, if a number of previously determined columns or rows exceeds an upper limit; and

the data estimation device compares a first determined block of a newly determined column or row to a corresponding block of a previously determined column or row, prior to determining subsequent blocks of the newly determined column or row.

22. The base station of claim 18 wherein the approximate Cholesky factor is lower triangular.

23. The base station of claim 18 wherein:

the approximate Cholesky factor comprises a plurality of K by K blocks and K is a number of the received signals;

the approximate Cholesky factor is determined by columns; and

the block columns comprise a multiple equal to one or more L blocks in length and L is the longest length of intersymbol interference.